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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/869,912	07/09/2001	Makoto Iida	110051	2731

25944 7590 04/02/2004

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EXAMINER

KUNEMUND, ROBERT M

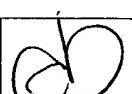
ART UNIT

PAPER NUMBER

1765

DATE MAILED: 04/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/869,912	Applicant(s) IIDA ET AL.	
	Examiner Robert M Kunemund	Art Unit 1765	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
 - If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
 - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
 - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 November 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 13-33 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 13-33 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Art Unit: 1765

The rejections

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 13 to 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tamatsuka et al (6,162,708) in view of Iida et al.

The Tamatsuka et al reference teaches a silicon wafer and the process of producing a silicon wafer. The silicon wafer is made by a Czochralski process. A silicon crystal is pulled from a melt. The resultant crystal is heat treated after growth. The crystal is sliced to create the silicon wafer. The silicon is doped with nitrogen in the range of 1×10^{10} to 1×10^{15} . The oxygen concentration is less than 18 ppma, note entire reference. The sole difference between the instant claims and the prior art is the F/G.

Art Unit: 1765

However, the Iida et al reference teaches an F/G ratio in the claimed range when growing nitrogen doped silicon by the Czochralski process with an N-region across the wafer, note page 505. It would have been obvious to one of ordinary skill to modify the Tamatsuka et al reference by the teachings of the Iida et al reference to use a specific F/G in order to effect the properties of the crystal as the Iida et al reference clearly sets forth that F/G is a result effect parameter.

Response to Applicants' Arguments

Applicant's arguments filed April 28, 2003 have been fully considered but they are not persuasive.

Applicants' argument concerning the F/G ratio is noted. However, according to applicants' own specification the F/G is important in producing the product of claims and obtaining the desired wafer. Thus, the prior art must have this in order to meet the claims.

Applicants' argument concerning the Tamatsuka et al reference is noted. Applicants have not supplied any evidence that the doping done in the Tamatsuka et al reference does not produce an N region across the wafer. The nitrogen doping is done in the same manner as is instantly done, thus, the results would inherently be the same. Further, the reference does teach oxygen concentration range which clearly overlaps the instantly claimed range. Also, the examiner has not used the reference to teach the F/G ratio. Therefore, the reference does in fact read on the oxygen content in the grown silicon crystal. The reference does teach that OSFs are not generated in the grown silicon, note col. 3 lines 10-25.

The instant specification and claims recite a narrower oxygen range, however, applicants have not shown the criticality of the end points of the range since the prior art overlaps the claimed range.

Applicants' argument concerning the Iida et al reference has been considered and not deemed persuasive. The reference does teach an n region across the entire plane and also teaches that oxygen is a result effective parameter, which affects the OSF rings. The reference further teaches the F/G parameter. The reference does teach an after treatment.

Applicants' argument concerning the combination of references is noted. However, the two references when combined teach the claimed invention. The references teach an N region across the entire wafer plane. The references teach a silicon ingot grown by the Czochralski method doped with nitrogen. The references teach the claimed oxygen range. The reference further teaches to one of ordinary skill in the art that changes to oxygen, nitrogen and other process parameters will effect the properties of the grown ingot and thus render the changes by applicant as obvious.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

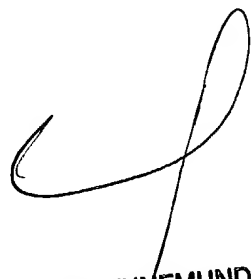
extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Robert M Kunemund whose telephone number is 571-272-1464. The examiner can normally be reached on 8 hours.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on 571-272-1465. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

RMK



ROBERT KUNEMUND
PRIMARY EXAMINER